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A study on Malaysian teachers' level of ICT skills and practices, and its impact on teaching and learning

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Abstract

This study intends to investigate the levels of Malaysian teachers' ICT skills, namely, Basic and Advanced ICT skills, Internet skills for information seeking and sharing as well as Internet skills for communication. It also plans to investigate the correlations between teachers' years of services and their computer experiences, and the effects of ICT use on teaching and learning. In addition, the study intends to investigate whether there are any significant differences on the frequency of ICT use in classroom for (i) teaching and learning, (ii) searching educational resources, (iii) creating presentation/delivery materials, and (iv) preparing lesson plan between male and female teachers, and between teachers from different age groups. A set of questionnaire has been sent to 7,320 primary and secondary school teachers throughout Malaysia. A total of 2661 teachers have responded to the questionnaire (a return rate of 36.4%). The findings indicate that the teachers are 'highly skilled' in (i) Internet skills for information seeking/sharing (mean: 3.35), (ii) Basic ICT skills (mean: 3.13), and (iii) Internet skills for communication (mean: 3.01). However, the respondents' level for the Advanced ICT Skills is at the 'Moderate' level (mean: 2.31). Also, there is no correlation between the teachers' *years of service* and the perceived impact of ICT on their *teaching* (r : -0.038) and *student learning* (r : 0.022). A very weak correlation (r : 0.109) was also observed between their *computer experience* and the impact of ICT on *teaching*. There is also no correlation between the respondents' *computers experience* and the impact of ICT on *students learning* (r : 0.0069). Furthermore, the findings indicate that male teachers use ICT in classroom significantly more frequent than their female colleagues for *teaching and learning* as well as for *creating presentation/delivery materials*. Moreover, there are significant differences in the use of ICT for *searching educational resources*, *creating presentation/delivery materials*, and *preparing lesson plan* for teachers in the different age groups. Therefore, the relevant parties need to propose an initiative and prepare an action plan so that the teachers, especially the senior ones, acquire the four ICT skills. Ample and continuous trainings should also be conducted to ensure that our teachers are competent in using ICT. This in return, will produce a generation of students with high levels of ICT skills in the future.

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1. Introduction

Information and Communication Technology or ICT has impacted every aspect of our lives, and education is of no exception. As a nation moving towards a developed country come year 2020, Malaysia is fully aware of the importance of ICT, and there have been various ICT initiatives being introduced in the current education system. Smart Schools, MySchoolNet, computer labs, Educational web TV, Teaching Mathematics and Science in English

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(using ICT), Access Centre, and several others are some of the examples of these initiatives. These initiatives were also introduced to enhance the teaching and learning processes using multimedia and the Internet. The Ministry of Education has allocated huge amount of money to prepare and equip the schools with ICT facilities as well as ICT tools and equipment. In addition, teachers have also been trained to use ICT to enhance their teaching and learning sessions.

ICT is considered as a tool to revolutionize learning, to enrich the curriculum, the develop pedagogy, as well as to improve students' learning (Ministry of Education, 2006). The integration of ICT in teaching and learning relies very much on the teachers' initiatives. The main goal of ICT integration in the school curriculum is to assist students developing their ability to use, manage and understand ICT. But, to achieve this, the teachers themselves have to be well prepared and competent in ICT. They have to be ready in terms of ICT skills to face their students who are mostly 'Digital Natives' and are generally comfortable using any ICT devices.

Previous studies indicated that ICT integration is a complex phenomenon (e.g.: Mackey & Mills, 2002; Ng, Miao & Lee, 2010) and technology or computer use among teachers is a complicated process (Chen, 2010; van Braak, Tondeur & Valcke, 2004). Within years of implementing various technology initiatives in Malaysian education systems, Ismail, Zakaria and Aziz (2007) reported that teachers' level of technology integration was still low. There are numerous studies in Malaysian context on in-service teachers' technology integration in teaching and learning (e.g.: Ismail, et al. 2007; Mahmud, et al. 2007; Mohd Salleh, Mohd Nordin & Mohd Jelas, 2008). However, the proposed study also aimed to look into the teachers' levels of ICT and Internet skills. In addition, it also intended to investigate whether their years of teaching and experience in using computer correlate with the use of ICT for teaching and learning, and whether there are differences in ICT use between male and female teachers and those in different age groups.

2. Research Question

In this study, four primary research questions were addressed:

1. What are the teachers' levels of (i) basic ICT skills, (ii) advanced ICT skills, (iii) Internet application for information access, and (iv) Internet application for communication purposes?
2. Are there any correlations between the teachers' years of service and experience using computers with *the effects of ICT use on their teaching practices*?
3. Are there any correlations between the teachers' years of service and experience using computers with *the effects of ICT use on the students' learning*?
4. Are there any significant differences in terms of *frequency of ICT use in classroom* between male and female teachers, and between teachers in different age groups?

3. Research Methodology

The population for this research was school teachers throughout Malaysia. A stratified random sampling was applied to select the sample for this study. Firstly, the administrative zones of all the states in Malaysia were identified to attempt fairness in selecting the schools according to the number of schools located in the zones. The identified zones are Northern Zone; Eastern Zone; Southern Zone; Central Zone and East Malaysia. The schools were randomly selected from each zone according to their locations (either rural or urban). From the random stratified sampling, a total of 212 secondary schools and 154 primary schools have been selected, in which 20 teachers from each school were selected as the participants in this study. Hence, a total of 7,320 primary and secondary school teachers have been identified.

A questionnaire on teachers' ICT skills, ICT use, and its effects on teaching and learning was used in this study. It consists of 55 items and was categorized into five broad sections. The details of each section were summarized in Table 1. The α -values of at least 0.6 indicate that the items are reliable (Chua, 2006).

Table 1: Description on the sections of the questionnaire instrument

Section	Description	Number of items	Scale	Reliability value
A	Demography (including years of service and computer experience)	6	-	-
B	Level of ICT skills	23	Scale from 0-4 0: no skill; 2: moderate skill; 4: highly skilled	0.88
C	Frequency of ICT use in classroom in a week	10	0: never; 1-3 times/week; 4-6 times/week 7-9 times/week; >10 times/week	0.88
D	Perceived effects of ICT use on teaching	8	Scale from 1 to 5 1: strongly disagree; 5: strongly agree	0.68
E	Perceived effects of ICT use on student learning	8	Scale from 1 to 5 1: strongly disagree; 5: strongly agree	0.63
TOTAL		55		

4. Results and discussion

A total of 7320 teachers have been randomly selected to participate in this study, and the questionnaire was mailed to each respondent through their respective schools. However, only 2661 teachers have returned the questionnaire (a response rate of 36.34%). Demographic data indicates that 672 respondents (25.3%) are male while 1989 respondents (74.7%) are female teachers. The data also indicates that 517 respondents (19.4%) are less than 30 years old, majority of them (1971 respondents or 74.1%) are between 30-50 years old, and only 173 (6.5%) are more than 50 years old.

In terms of teaching services, a total of 627 respondents (23.6%) have been in this service between 1-5 years, another 535 respondents (20.1%) have been teaching between 6-10 years, 660 respondents (24.8%) between 11-15 years, while another 839 respondents (31.5%) have been in the teaching service for more than 15 years. Meanwhile, in terms of years of experience using computer, the findings vary. A total of 145 respondents (5.4%) have between 1-3 years of computer experience, 369 respondents (13.9%) with between 4-6 years of experience, 574 respondents (21.6%) with 7-9 years experience, and majority of them (1573 or 59.1%) have more than 10 years of computer experience. In addition, majority of the respondents (1830 or 68.8%) possessed a bachelor's degree, another 392 respondents (14.7%) owned a diploma in education, while 248 respondents (9.3%) with a teaching certificate. Also, 191 respondents held a master degree, but no one has any PhD qualification.

In order to determine the respondents' levels of the four types of ICT skills, the author has divided the five-point scale to three levels: High, Moderate and Low. Table 2 highlights this determination. Thus, the respondents' ICT skills' levels are summarized in Table 3.

Table 2: Determination of ICT level

Mean range	Skill level
0.00 – 1.33	Low
1.34 – 2.66	Moderate
2.67 – 4.00	High

Table 3: ICT skills among the respondents (N: 2661)

ICT skills	Mean	Skill level
(i) Basic ICT skills	3.13	High
(ii) Advanced ICT skills	2.31	Moderate
(iii) Internet application to access & share information	3.35	High
(iv) Internet application for communication	3.01	High

Based on Table 3, it was observed that the respondents are ‘highly’ competent in the *Basic ICT skills* (mean: 3.13). In other words, the respondents claimed that they are highly competent in the Basic ICT skills such as word processing, spreadsheet, and slide presentation. Meanwhile, for the *Advanced ICT skills*, they scored the lowest (mean: 2.31), indicating that the respondents’ skills in graphics and animation as well as multimedia production are at the ‘moderate’ level. However, the respondents indicate the highest score in the ‘Internet application to access and share information’ with a mean of 3.35, which signifies that they do have a high level of Internet skills in accessing and sharing information with others. Then, a slightly lower mean score (mean: 3.01) for ‘Internet application for communication purposes’ was recorded – a score which indicates that the teachers are skillful in communicating with others using the Internet technologies such as email, web camera and teleconferencing.

The findings of this study revealed that majority of the respondents are skillful in the Internet application to access and share information, which signifies that Malaysian teachers are highly competent in using Internet for searching and sharing information. As Internet technology has been introduced for more than three decades ago, it is of no surprise that those teachers are able to use it to seek information. Furthermore, the respondents claimed that they are also competent in Basic ICT skills such as using word processor, spreadsheet, and slide presentation. These three software applications are commonly used among educators and students alike, and nowadays, teachers are expected to be competent in these ICT skills to assist them in their teaching activities. The result also indicated that the respondents are also highly competent in ICT for communication purposes. With various Internet communication applications such as email, chat-rooms, and social networking sites (for instance: Facebook), it is not a surprise to observe this finding among the respondents. However, they still lack some skills in the advanced ICT levels such as in producing graphics and animations as well as multimedia design. This finding on Advanced ICT skills is consistent with previous research which indicates that their respondents’ ICT skills are at the moderate level (example: Mahmud, Ismail, Mohd Yasin, Mustapha & Din, 2006).

This study also aimed to investigate whether there are any correlations between *years of teaching service* and *computer experience* and the teachers’ perceived impact of ICT use in *teaching* as well as their perceived impact on students’ *learning*. Table 4 summarizes the findings.

Table 4: Findings on the correlation analyses

	Impact of ICT use on <i>teachers’ teaching</i>			Impact of ICT use on <i>students’ learning</i>		
	Correlation Coefficient, r	r ²	p-value	Correlation coefficient, r	r ²	p-value
Years of teaching service	-0.038	0.0014 (0.14%)	0.048	0.022	0.0005 (0.05%)	0.246
Computer experience	0.109	0.0119 (1.19%)	0.000	0.069	0.0048 (0.47%)	0.000

Overall, the results pertaining to correlation analysis revealed ‘no correlation’ findings: (a) between *years of teaching* and impact of ICT use on the *teachers’ teaching* (r:-0.038), (b) between *years of teaching* and impact of ICT use on *students’ learning* (r:-0.022), and (c) between *computer use experience* and impact of ICT use in the *students’ learning* (r:-0.069). However, a very weak correlation (r: 0.109) was observed between the teachers’ *computer experience* and the impact of ICT use on their *teaching*. The findings indicate that, overall, there is no correlation between the teachers’ years of teaching service and the impact of ICT use in their teaching process as perceived by

those respondents. No correlation was also observed between the teachers' years of service and the perceived impact of ICT use on students' learning. No correlation was also reported between the respondents' computer experience and the impact of ICT use on students' learning. In other words, the findings indicated that there are no correlations between their years of teaching service and years of computer experience and the perceived impact of ICT use on students' learning.

In addition, the study intends to investigate whether there are any significant differences on the *frequency of ICT use* in classroom in a week for (i) *teaching and learning*, (ii) *searching educational resources*, (iii) *creating presentation/delivery materials*, and (iv) *preparing lesson plan*, between male and female teachers, and between teachers from different age groups.

The finding indicates that male teachers use ICT in classroom significantly more frequent than their female colleagues in the aspects of *teaching and learning* (x_{male} : 2.44; x_{female} : 2.28; F-value: 3.75; p-value: 0.00) as well as *creating presentation/delivery materials* (x_{male} : 2.34; x_{female} : 2.18; F-value: 3.697; p-value: 0.00). However, no significant differences were observed between the male and female teachers in terms of the frequency of ICT use for *information seeking* (x_{male} : 2.87; x_{female} : 2.82; F-value: 0.908; p-value: 0.364) and ICT use for *preparing lesson plan* (x_{male} : 2.51; x_{female} : 2.44; F-value: 0.301; p-value: 0.193). Male teachers are perhaps more confident in using ICT in classroom, and thus, use ICT more frequent than the female teachers. In addition, as most of the classrooms are not equipped with ICT tools and equipment, it is possible that female teachers find it burdensome to acquire, prepare and carry the ICT equipment from the school's ICT resource centre to their classrooms.

Moreover, the analysis revealed a significant difference in the frequency of ICT use to *search for educational resources* for teachers in the different age groups ($x_{<30 \text{ years}}$: 3.106; $x_{30-50 \text{ years}}$: 2.88; $x_{>50 \text{ years}}$: 2.49; F-value: 25.71; p-value: 0.00). Post-hoc analysis indicated that those who are less than 30 years old use *ICT to search for educational resources* significantly more frequent than the teachers of at least 50 years old. However, no significant differences in this aspect between the first age group (less than 30 years old) and those in the 30-50 years age-group, as well as between the 30-50 years old and those in the above 50 years old group. A similar result of significant difference was observed between the teachers with different age groups in terms of the frequency of ICT use for *creating presentation/delivery materials* ($x_{<30 \text{ years}}$: 2.431; $x_{30-50 \text{ years}}$: 2.182; $x_{>50 \text{ years}}$: 2.046; F-value: 16.696; p-value: 0.00). Post-hoc analysis revealed that those aged less than 30 years old use ICT significantly more frequent than those between 30-50 years old and those in the above 50 years old group. However, no significant difference was observed in the frequency of ICT use for creating presentation/delivery between the 30-50 years old group and those aged more than 50 years old.

Another finding indicated a significant difference in the frequency of ICT use for *preparing lesson plan* between the respondents in the different age groups ($x_{<30 \text{ years}}$: 2.700; $x_{30-50 \text{ years}}$: 2.416; $x_{>50 \text{ years}}$: 2.266; F-value: 17.048; p-value: 0.00). Post-hoc analyses revealed that the respondents who are less than 30 years old use ICT significantly more frequent than those between 30-50 years old and those with more than 50 years old. In addition, no significant difference was observed in the frequency of ICT use for *preparing lesson plan* between the 30-50 years old group and those aged more than 50 years old. In terms of the frequency of *ICT use for teaching and learning*, the finding indicates a non-significant difference ($x_{<30 \text{ years}}$: 2.385; $x_{30-50 \text{ years}}$: 2.310; $x_{>50 \text{ years}}$: 2.22; F-value: 2.24; p-value: 0.107). Post-hoc analysis also revealed no significant differences between the teachers in the three different age groups (less than 30 years old, between 30-50 years old and those above 50 years old). In general, teachers who are less than 30 years old use ICT significantly more frequent than those aged between 30 – 50 years old and those above 50 years old. This finding is expected as the younger generations of teachers are more technology savvy and are more confident in using it. This finding is supported by that of Abdullah and Bujang (2007) study in that teachers' age will affect the ICT integration.

5. Conclusion

In general, Malaysian schools teachers are competent in Basic ICT skills, Internet application for accessing and sharing information and Internet application for communication purposes. However, they still lack some competencies in Advanced ICT skills including the graphics, animation and multimedia production. Thus, the teachers should be exposed to the trainings related to these skills. Also, the findings of no correlations indicating that the teachers have similar perceptions regarding the impacts of ICT use on *teaching* and *student learning* regardless of their *years of teaching* and *computer experience*. In addition, female teachers need to use ICT more frequently, and the parties concerned should equip our classrooms with ICT facilities to ensure more usage of ICT in classes among this group of teachers. Finally, the junior teachers use ICT significantly more frequent than their senior colleagues for *teaching and learning*, *searching educational resources*, and *creating presentation/delivery materials*. Thus, senior teachers should be encouraged to use ICT in their teaching and learning activities more frequent so that they will not be left behind in terms of ICT skills.

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